

REMARKS

Claims 1, 3-13, and 15-25 are presented for further examination. Claims 2, 14, and 26-29 have been canceled. Claims 1, 5, 6, 13, 16-19, 24, and 25 have been amended.

In the Office Action mailed April 16, 2004, the Examiner objected to and rejected a number of the claims under 35 U.S.C. § 112 for informalities and lack of antecedent basis. Applicants have amended the claims to overcome the informalities noted by the Examiner.

Claims 1, 6, 10-13, 18, and 20-25 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 5,963,596 (“Benbassat et al.”). Claims 2-5, 9, and 14-17 were rejected under 35 U.S.C. § 103(a) as obvious over Benbassat et al. in view of U.S. Patent No. 5,410,355 (“Kolczynski”). Claims 7, 8, and 19 were rejected as obvious over Benbassat et al. in view of U.S. Patent No. 5,893,066 (“Hong”).

Applicants respectfully disagree with the bases for the rejections and request reconsideration and further examination of the claims.

The disclosed embodiments of the present invention are directed to an apparatus and method for depacketizing and aligning input data that is received in a packetized format using an apparatus and method that reduces processing load in a data processor using a low-complexity input stream processor. Moreover, the present invention provides methods of handling data alignment and FIFO management based on the apparatus and method. While other methods and apparatus for depacketizing and data alignment are known, such prior methods and processes are complex and have a high processing overhead, as discussed in more detail in the background portion of the present specification.

In accordance with one embodiment of the invention, an apparatus for depacketizing and aligning input data from a packetized data format is provided. The apparatus has a data processor that receives input data from an input memory, the data processor configured to determine the payload size of the data packet and generating a signal indicative of the size of the payload. The data processor is also configured to receive and effect data processing of the payload itself; after the payload has been processed by a word formatter. The apparatus further includes a payload counter for controlling the input memory in accordance with the payload size signal and to cause payload units to be output from the input memory to the

word formatter. The word formatter receives the units of the payload outputted from the input memory and gathers and aligns the units to form data words for subsequent processing. The data words are received at an input buffer for storing and transferring to the data processor, at which point the data processor uses the received words and processes them accordingly.

Hence, according to the scheme of the present invention, the packetized input data is initially analyzed by the data processor to determine its size, after which it is sent to the word formatter for outputting in word format, and then subsequent processing by the data processor. In addition, input of the packetized input data is controlled through an interface that is configured to perform handshaking with the source of the packetized input data. As will be appreciated, the data processor is used only for determining the size of the payload and generating the size signal and then for subsequent processing of the formatted words retrieved from the packetized input data.

Benbassat et al., U.S. Patent No. 5,963,596, is directed to an audio decoder circuit and method of operation. Benbassat et al. do not address the depacketizing and aligning of input data received in a packetized format. Rather, Benbassat et al. specifically teach and claim the apparatus substantially as shown in Figure 1, which includes a microprocessor (12) coupled to a control status register (22) for controlling operation of a host interface block (18), a system decoder block (20), an audio decoder block (28), a hardware filter arithmetic unit block (32), and a PCM output block (36) that together form a decoder unit. Benbassat et al. also teach a plurality of buffers, including an input buffer after the system decoder block, an arithmetic unit buffer (30) after the audio decoder block, and a PCM buffer (34) after the hardware filter arithmetic unit block (32). Benbassat et al. do not teach or suggest the use of a data processor for not only determining the payload size of the data packet and generating a payload size signal, but also for later processing of the words formed from the packetized data. At most, Benbassat et al. teach a controller or microprocessor host (12) that controls operation of the audio decoder unit (14). Moreover, Benbassat et al. do not teach or suggest a data processor that receives the bit stream for determining the payload size of the data packet. Rather, in Benbassat et al. the bit stream is received directly into a host interface block (18), bypassing the microprocessor hosts (12).

In addition, Benbassat et al. do not teach a word formatter for receiving units of payload outputted from the input memory and gathering and aligning the units to form data words and for outputting the data words. Rather, in Benbassat et al., the host interface (18) passes the encoded bit stream to a system decoder block (20) that identifies and retrieves the appropriate encoded data from the bit stream and loads this information into an input buffer (24), as shown in Figure 1. The encoded audio data is retrieved from the input buffer (24) by the audio decoder block (28) that breaks the bit stream up into coded samples associated with subbands used in the encoding and compression process. The audio decoder also retrieves the subband filter coefficient indices that are used to generate the final output data. In addition, the audio decoder block (28) expands the samples to 16-bit values and stores them in an arithmetic unit buffer (30). This buffer functions to desynchronize the stream of audio information which is then output to a hardware filter arithmetic unit block (32) that completes the decoding of the audio information from the 16-bit samples and scale factor indexes by dequantizing, transforming, and filtering the subband samples to form conventional PCM audio information that is then output to the buffer (34).

Turning to the claims, claim 1 recites an apparatus for depacketizing and aligning input data having a packetized format. Nowhere do Benbassat et al. teach or suggest depacketizing and aligning input data having a packetized format. Claim 1 further recites an input memory for receiving, storing, and output of input data, and for outputting of units of a payload of a data packet of the input data; and a data input interface through which the input data is transferred to the input memory, the data input interface configured to perform handshaking with a packetized data source of the input data. Nowhere do Benbassat et al., taken alone or in any combination with Kolczynski, teach or suggest a depacketizing and aligning apparatus having a data input interface in combination with an input memory as recited in claim 1. Claim 1 also recites a data processing means for receiving the outputted input data from the input memory and detecting, identifying, and determining payload size of the data packet and generating a payload size signal indicative of the size of the payload and for separately receiving and effective data processing of the payload. Nowhere do Benbassat et al. taken alone or in combination with Kolczynski, teach or suggest such data processing means.

Claim 1 further recites a word formatter for receiving the units of the payload outputted from the input memory, gathering and aligning the units to form data words and for outputting the data words, a payload counter for controlling the input memory in accordance with the payload size signal and configured to cause the payload units to be outputted from the input memory to the word formatter; and an input buffer for receiving the data words from the word formatter and storing them, and for transferring the data words to the data processing means to effect separate receiving of the payload and data processing using the received data words. As discussed above, neither Benbassat et al. nor Kolczynski, taken alone or in any combination thereof, teach or suggest the combination recited in claim 1 wherein each of the components cooperate as recited in claim 1. Nowhere do Benbassat et al. teach or suggest a data processing means. Moreover, the combination of Benbassat et al. and Kolczynski fails to teach or suggest a data processing means that identifies and determines the payload size of the data packet and then separately receives and effects data processing of the payload that is formatted to form data words by a word formatter. In view of the foregoing, applicants respectfully submit that claim 1 and all claims depending therefrom are clearly allowable over Benbassat et al., taken alone and in combination with Kolczynski and Hong, U.S. Patent No. 5,893,066.

Independent claim 13 is directed to a method for depacketizing and aligning input data having a packetized format. Claim 13 recites the steps of receiving and storing the input data in an input memory by transferring input data to the input memory via a data input interface that performs handshaking with a packetized data source of the input data. Benbassat et al. do not teach or suggest such a step. Claim 13 further recites outputting the stored input data to a data processing means. Nowhere do Benbassat et al. teach or suggest such a data processing means that, as recited in claim 13, detects, identifies, and determines a size of a payload of a data packet of the input data that is outputted thereto. The data processing means is further recited in claim 13 as effecting data processing on the data packet represented by data words transferred thereto by a word formatter, as recited in claim 13. As also recited therein, the input memory is controlled in accordance with a payload size signal generated by the data processing means to cause payload units that form the payload to be outputted from the input memory to a word formatter that gathers and aligns the payload units outputted therefrom to form data words.

Benbassat et al. fail to teach or suggest such a step using a word formatter. In addition, claim 13 recites outputting the data words from the word formatter to an input buffer and storing them in the input buffer for later transferring to the data processing means. As discussed above, nowhere do Benbassat et al., taken alone or in any combination with Kolczynski, teach or suggest the combination recited in claim 13. For these reasons as well as for the reasons discussed above with respect to claim 1, applicants respectfully submit that claim 13 and all claims depending therefrom are clearly in condition for allowance.

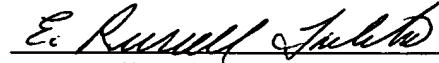
Independent claim 24, which is directed to an apparatus, and independent claim 25, which is directed to a method for depacketizing and aligning input data having a packetized format, are both allowable for the reasons discussed above with respect to claims 1 and 13.

In the event the Examiner disagrees or finds minor informalities that can be resolved by telephone conference, the Examiner is urged to contact applicants' undersigned representative by telephone at (206) 622-4900 in order to expeditiously resolve prosecution of this application. Consequently, early and favorable action allowing these claims and passing this case to issuance is respectfully solicited.

The Director is authorized to charge any additional fees due by way of this Amendment, or credit any overpayment, to our Deposit Account No. 19-1090.

Respectfully submitted,

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